

Abstract for ESA-3AF Space Propulsion 2014

Title: Green Mono Propulsion Activities at MSFC

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In 2012, the National Aeronautics & Space Administration (NASA) Space Technology Mission Directorate (STMD) began the process of building an integrated technology roadmap, including both technology pull and technology push strategies. Technology Area 1 (TA-01) for Launch Propulsion Systems and TA-02 In-Space Propulsion are two of the fourteen TA's that provide recommendations for the overall technology investment strategy and prioritization of NASA's space technology activities. Identified within these documents are future needs of green propellant use.

Green ionic liquid monopropellants and propulsion systems are beginning to be demonstrated in space flight environments. Starting in 2010 with the flight of PRISMA, a one Newton thruster system began on-orbit demonstrations operating on ammonium dinitramide based propellant. The NASA Green Propellant Infusion Mission (GPIM) plans to demonstrate both 1 N, and 22 N hydroxyl ammonium nitrate based thrusters in a 2015 flight demonstration. In addition, engineers at MSFC have been evaluating green propellant alternatives for both thrusters and auxiliary power units. This paper summarizes the status of these development/demonstration activities and investigates the potential for evolution of green propellants from small spacecraft and satellites to larger spacecraft systems, human exploration, and launch system auxiliary propulsion applications.